గణిత చంద్రిక

GANITHA CHANDRIKA

Volume:25 Issue:1&2 Year 2024

SRI CHAKRAM

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GANITHA CHANDRIKA

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Volume : 25 **Issue 1&2** **Year : 2024**

(January - June - 2024)

విషయ సూచిక

సంపాదకీయం

పాఠకలోకానికి నమస్సుమాంజలి. ఈ సంచిక "శ్రీచక్రం" ముఖచిత్రంతో వెలువడినది. శ్రీచక్రం యొక్క గణిత ప్రాముఖ్యతపైన వివరణ కూడా పొందు పరిచాము. సంచిక వెలువడడంలోని జాప్యానికి క్షంతవ్యులము. ఎప్పటిలాగానే online పద్ధతిలోనే వెబ్‌సైట్‌లో గణితచంద్రికను అందిస్తున్నాము. ఆసక్తికరమైన అంశాలను ఈ సంచికలో ప్రచురించడం జరిగింది. ఎప్పటిలాగే మీ ఆదరణాభిమానాలను కోరుకుంటున్నాము. పాఠకుల విలువైన అభిప్రాయాలను, గణితాంశాలను ఆహ్వానిస్తున్నాము.

Dr. B.B. రామశర్మ

Chief Editor

శ్రీచక్రం : ఆధ్యాత్మికతలో గణిత సమతుల్యత (Srichakram : The Mathematical Harmony in Spirituality)

శ్రీచక్రం – గణిత సంబంధిత ప్రాముఖ్యత

శ్రీచక్రం ఒక శక్తి చక్రం మాత్రమే కాకుండా, ఒక గణితసూత్రం, శాస్త్రీయంగా రూపకల్పన చేయబడిన యంత్రం కూడా. ఇది త్రిభుజాలు, వృత్తాలు, మరియు గణితపరంగా సరైన కోణాల్లో నిర్మించబడిన ఒక సంపూర్ణరూపం. దీని నిర్మాణం గణితం, శాస్త్రంపరంగా కూడా విశ్లేషించవచ్చు. దీనివల్ల నైపుణ్య పాఠాలకు ఇది ఆసక్తికరమైనది.

శ్రీచక్ర నిర్మాణం

శ్రీచక్రం మొత్తం 9 స్థాయిలతో (నవావరణాలు) నిర్మించబడింది. ఇందులో గణితపరంగా ప్రత్యేకమైన విభాగాలు ఉంటాయి. ఈ నిర్మాణంలో ప్రధానంగా త్రిభుజాలు కనిపిస్తాయి. శ్రీచక్రంలో 5 త్రిభుజాలు ఒక వైపుకి, 4 త్రిభుజాలు మరోవైపుకి ఉంటాయి. ఇవి సరైన కోణాలల్లో సరిపోలుగా గణించబడ్డాయి.

త్రిభుజాలు (Triangles) : శ్రీచక్రం యొక్క త్రిభుజాలు సమభుజ త్రిభుజాలుగా ఉండి, ఇవి సమతుల్యత, సమానకోణాలు, మరియు శక్తిని సూచిస్తాయి. త్రిభుజాలు ఒక దిక్కున యాంక్షరీకశక్తిని (Purusha Shakti) మరొక దిక్కున ఆంతర్యశక్తిని (Prakriti Shakti) సూచిస్తాయి.

వృత్తాలు (Circles) : గణితంలో వృత్తం యొక్క ప్రాముఖ్యతను మనం తెలుసుకున్నాం. శ్రీ చక్రంలో వృత్తాలు అర్ధం, సమతుల్యతను సూచిస్తాయి. ప్రతివృత్తం విశ్వంలోని భిన్న స్థాయిలను ప్రతిబింబిస్తుంది.

గణితసూత్రాలు

శ్రీచక్రం ప్రత్యేకమైన గణితసూత్రాల ఆధారంగా రూపొందించబడింది. దీని నిర్మాణం సానుకూల మరియు ప్రతికూల శక్తులను సమతుల్యం చేయడం కోసం ప్రత్యేక కోణలలో రూపకల్పన చేయబడింది. ఇక్కడ కొన్ని గణితసూత్రల ప్రభావం ఉంటుంది. ఉదాహరణకు :

సమానమైన కోణాలు : త్రిబుజాల కోణాలు 60^0 ఉంటాయి. ఇవి సరైన త్రిభుజాలను సూచిస్తాయి.

అక్షసమతుల్యత (Symmetry) : శ్రీచక్ర నిర్మాణంలో అనేక అక్షాల సమతుల్యత ఉంటుంది. ఇది గణితంలో అనుకూల సమతుల్యతకు సంకేతం.

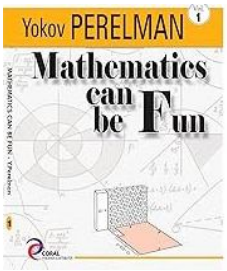
శ్రీచక్రంలో సారాంశం

1. **గణితమంత్రిత్వం :** శ్రీచక్రం గణితంగా రక్షణ మరియు శక్తిని సూచించే ఒక ప్రాముఖ్యత కలిగిన యంత్రం.
2. **గణితశాస్త్రం అన్వయం :** దీని సాంకేతిక నిర్మాణం గణిత కోణాలు, వృత్తాలు, త్రిభుజాలు ఆధారంగా ఉంటుంది.
3. అప్లికేషన్ : గణితంలో ఈ గణన విధానాలు, సమతుల్యత పాఠాల్లో ఉపయోగపడతాయి.

ఇది గణితశాస్త్రంలో ఉన్న శక్తిని తెలియజేయడమే కాకుండా, మన ఆధ్యాత్మిక వికాసంలో కూడా అనేక ఉపయోగాలు కలిగి ఉంటుంది. ఈ గణిత రహస్యం శ్రీ చక్రాన్ని ప్రత్యేకంగా నిలబెడుతుంది.

ఒక మంచి గణిత పుస్తకం

B. Sindhura,
Ph.D. IIT Hyderabad



పాఠశాల విద్యార్థులకు గణితంపై ఆసక్తిని పెంచడంలో వినోదాత్మకత గణితం (RecreationalMathematics) ఎంతో ముఖ్యమైన పాత్ర పోషిస్తుంది. ఈ నేపథ్యంలో Mathematics Can Be Fun అనే పుస్తకం విద్యార్థులకు గణితాన్ని సరదాగా, ఆసక్తికరంగా నేర్చుకునే మార్గాలను అందిస్తుంది.

పుస్తక వివరాలు

పేరు	:	Mathematics Can Be Fun
రచయిత	:	Yakov Perelman
ప్రచురణకర్తలు	:	Raduga Publishers
ధర	:	Rs. 300
పేజీలు	:	250
భాష	:	English
ISBN		978-5-09-030109-5

పుస్తకంలోని అంశాలు : 'Yakov Perelman' గారు రాసిన **Mathematics Can Be Fun** పుస్తకం వినోదాత్మక గణిత పజిల్స్, సవాళు మరియు ఆసక్తికరమైన గణిత క్రీడల ద్వారా విద్యార్థులకు గణితంపై ప్రేమను పెంచడానికి రూపొందించబడింది. పుసక్తంలో గణిత సూత్రాలు మరియు సిద్ధాంతాలను సరదాగా, సరళంగా వివరించడం ద్వారా విద్యార్థులలో గణితంపై ఆసక్తిని పెంచడంలో సహాయపడుతుంది.

ముఖ్య అంశాలు

1. **గణితపజిల్స్ :** విద్యార్థులకు సులభంగా అర్థం చేసుకునే రీతిలో రూపొందించిన ఆసక్తికరమైన పజిల్స్
2. **సంఖ్యా విశ్లేషణ :** ప్రత్యేక సంఖ్యా సమూహాలు, చారిత్రక గణిత గీతాలు.
3. **సమీకరణాలు మరియు పద్ధతులు :** వినోదాత్మక విధానాల ద్వారా గణితాన్ని నేర్చుకోవడం.
4. **గణితవినోదం :** గణితం పట్ల మరింత ఆసక్తిని పెంచే అంశాలు.

విద్యార్థులకు ఉపయోగం : ఈ పుస్తకం పాఠశాల విద్యార్థులకు వినోదాత్మక గణితాన్ని సమర్థంగా పరిచయం చేస్తుంది. గణితంపై ఉత్సాహం లేకున్నా, ఈ పుస్తకం విద్యార్థుల్లో ఆలోచనాశక్తిని పెంచుతుంది మరియు వారి అభ్యాసాన్ని మరింత ఆసక్తికరంగా చేస్తుంది.

ఎక్కడ అందుబాటులో ఉంటుంది : ఈ పుస్తకం *Amazon*, *Flipkart* మరియు ఇతర ఆన్‌లైన్ పుస్తక వేదికలలో అందుబాటులో ఉంది. ఈ పుస్తకాన్ని ఆర్డర్ చేసి ఇంటికి తెప్పించుకోవచ్చు.

సంప్రదించవలసిన చిరునామా :

∗ Amazon India ∗ Flipkart ∗ Local Bookstores

Key to MSET = 2023 Questions

Class	Questions														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
V	2	1	4	2	1	2	4	2	1	3	4	3	3	4	2
VI	2	3	1	1	1	3	1	3	2	2	1	2	3	2	2
VII	1	1	3	1	3	2	3	2	1	1	1	3	2	2	1
VIII	2	4	4	2	4	3	2	2	1	3	4	2	1	1	4
IX	1	1	2	4	1	1	3	2	4	1	3	1	3	3	3
X	2	3	1	3	3	1	1	1	2	4	2	3	2	3	1

Indian Institute of Technology (IITs)

B. RITHWIK
B.Tech 2nd Year, Mumbai

India's rapid development in science and technology has led to an increasing demand for highly skilled technical manpower. Addressing this need, there are currently twenty-three Indian Institutes of Technology (IITs) located across the country. All IITs operate under the governance of The Institutes of Technology Act, 1961, which designates them as "Institutions of National Importance" and outlines their powers, duties, and governance framework.

IITs offer a diverse range of programs, including undergraduate courses in various engineering and technology disciplines, as well as postgraduate and Ph.D. programs. They are known for their specialization in interdisciplinary research areas and conduct basic, applied, and sponsored research. The degrees offered by IITs include B. Tech., B. Arch., M.Sc., M. Design, M. Phil., M. Tech., MBA, and Ph.D. Admission to these programs is highly competitive and is determined by performance in national admission tests such as the Joint Entrance Examination (Advanced) for B. Tech courses, the Graduate Aptitude Test in Engineering (GATE) for M. Tech, and the Joint Admission Test for M.Sc. (JAM).

Focus on Research and Innovation

The IITs have also placed a strong emphasis on research and innovation, aligning with the Government's initiatives to develop indigenous R&D capabilities, enhance manufacturing, and foster a successful startup culture.

1. Research Parks:Research Parks are being established at various IITs to strengthen R&D capabilities and promote the growth of startups, thereby contributing to the nation's technological and industrial development.
2. IMPRINT: The Impacting Research Innovation and Technology (IMPRINT) initiative, launched on November 5, 2015, aims to address pressing engineering challenges by translating knowledge into viable technologies. It focuses on ten technology domains: healthcare, energy, sustainable habitat, nanotechnology hardware, water resources, advanced materials, information and communication technology, manufacturing, security and defense, and environmental science and climate change.
3. IMPRINT-II: Building on the success of IMPRINT, IMPRINT-II was developed by merging it with the Uchhatar Avishkar Yojana (UAY). Projects under IMPRINT-II receive joint funding from the Ministry of Education (MoE) and the Department of Science and Technology (DST) on a 50:50 basis, with additional funding from relevant Ministries and industries.

4. Uchhatar Avishkar Yojana (UAY): Launched in 2015, UAY aims to foster higher-order innovation that meets industrial needs and enhances the global competitiveness of Indian manufacturing. This initiative promotes academia-industry collaboration, with project funding split between industry (25%), the participating Department/Ministry (25%), and the MoE (50%).
5. ASEAN Fellowship Scheme: Approved for up to 1000 fellowships, this scheme enables students from ASEAN countries to pursue integrated Ph.D. programs at IITs over seven years. The fellowship provides the same financial support as for Indian students, including a yearly research grant. IIT Delhi coordinates this scheme nationally.

Increasing Female Enrolment

IITs have also undertaken significant steps to enhance gender diversity. In 2016, female enrolment in IITs stood at just 8%. To address this disparity, a decision was made to create supernumerary seats, with the goal of increasing female enrolment to 14% in 2018-19, 17% in 2019-20, and 20% in 2020-21. These efforts have yielded positive results, with female enrolment in B.Tech programs rising to 15.29% in 2018, 18% in 2019, and 19.8% in 2020. In 2021, female enrolment reached 19.72%, with the creation of 1,534 supernumerary seats.

List of IITs

SL	Name of the Organisation	AISHE Code	Website
1.	Indian Institute of Tech-nology (IIT), Gandhi Nagar	U-0139	http://www.iitgn.ac.in/
2.	Indian Institute of Technology (IIT), Bhubaneshwar	U-0355	http://www.iitbbs.ac.in/
3.	Indian Institute of Technology (IIT), Madras	U-0456	http://www.iitm.ac.in/
4.	Indian Institute of Technology (IIT), Guwahati	U-0053	http://www.iitg.ernet.in/
5.	Indian Institute of Technology (IIT), Indore	U-0273	http://www.iiti.ac.in/
6.	Indian Institute of Technology (IIT), Kanpur	U-0517	http://www.iitk.ac.in/
7.	Indian Institute of Technology (IIT), Jodhpur	U-0395	https://www.iitj.ac.in/

SL	Name of the Organisation	AISHE Code	Website
8.	Indian Institute of Technology (IIT), Kharagpur	U-0573	http://www.iitkgp.ac.in/
9.	Indian Institute of Technology (IIT), Hyderabad	U-0013	http://www.iith.ac.in
10.	Indian Institute of Technology (IIT), Mumbai	U-0306	http://www.iitb.ac.in/
11.	Indian Institute of Technology (IIT), Patna	U-0064	http://www.iitp.ac.in/
12.	Indian Institute of Technology (IIT), Delhi	U-0100	http://www.iitd.ac.in/
13.	Indian Institute of Technology (IIT), Ropar	U-0378	http://www.iitrpr.ac.in/
14.	Indian Institute of Technology (IIT), Mandi	U-0184	http://ww.iitmandi.ac.in/
15.	Indian Institute of Technology (IIT), Roorkee	U-0560	https://www.iitr.ac.in

SL	Name of the Organisation	AISHE Code	Website
16.	Indian Institute of Technology (IIT), (Banaras Hindu University), Varanasi	U-0701	http://iitbhu.ac.in
17.	Indian Institute of Technology (IIT), Jammu	U-0906	http://iitjammu.ac.in
18.	Indian Institute of Technology (IIT), Palakkad	U-0878	http://iitpkd.ac.in
19.	Indian Institute of Technology (IIT), Tirupati	U-0844	http://iittp.ac.in/
20.	Indian Institute of Technology (IIT), Goa	U-0907	http://www.iitgoa.ac.in
21.	Indian Institute of Technology (IIT), Bhilai	U-0946	https: www.iitbhilai.ac.in/
22.	Indian Institute of Technology (IIT), Dharwad	U-0899	http://www.iitdh.ac.in/
23.	Indian Institute of Technology (IIT), (Indian School of Mines), Dhanbad	U-0205	https://www.iitism.ac.in

GOLDEN RATIO

V. PAVAN KUMAR
M.Tech, Hyderabad

The Golden Ratio, often denoted by the Greek letter ϕ(phi), is a mathematical concept that has fascinated mathematicians, artists, architects, and nature enthusiasts for centuries. This irrational number, approximately equal to 1.6180339887, is renowned not only for its mathematical properties but also for its aesthetic and structural significance in art, architecture, and nature.

Mathematical Definition and Properties

The Golden Ratio arises when a line is divided into two parts in such a way that the ratio of the whole line to the longer segment is the same as the ratio of the longer segment to the shorter segment. Mathematically, if a line is divided into segments of lengths (a) and (b)

where (a > b), the ratio is expressed as:

$$\frac{a+b}{a} = \frac{a}{b} = \phi$$

This equation leads to the quadratic equation :

$$\phi^2 - \phi - 1 = 0$$

Solving this yields the positive solution :

$$\phi = \frac{1+\sqrt{5}}{2} \approx 1.6180339887$$

The negative solution, $\frac{1}{\phi}$, is often considered in contexts like continued fractions but is less prominent in the geometric interpretations.

One of the unique properties of the Golden Ratio is its relationship with the Fibonacci sequence. The Fibonacci sequence is a series of numbers where each number is the sum of the two preceding ones, typically starting with 0 and 1. As the sequence progresses, the ratio between consecutive Fibonacci numbers approximates the Golden Ratio.

The Golden Ratio in Art and Architecture

The aesthetic appeal of the Golden Ratio has been recognized since ancient times, influencing the design and composition of art and architecture. The Parthenon in Athens, the Great Pyramid of Giza, and Leonardo da Vinci's Vitruvian Man are often cited as examples where the Golden Ratio has been applied. Although some of these claims are debated, the Golden Ratio's impact on artistic design is undeniable.

In Renaissance art, the Golden Ratio was considered a guiding principle for creating harmonious compositions. Leonardo da Vinci, an avid mathematician as well as an artist, is believed to have used the Golden Ratio in his works, including the famous painting, ***The Last Supper***. The dimensions of the table, the positions of the apostles, and even the proportion of the walls are said to follow the Golden Ratio.

In architecture, the Golden Ratio is seen as a key to achieving balance and beauty. The Notre-Dame Cathedral, the UN Secretariat Building in New York, and the Swiss architect Le Corbusier's designs incorporate the Golden Ratio in their proportions. Le Corbusier, in particular, developed a system of proportions known as "Le Modulor" based on the

human scale and the Golden Ratio, which he used to design buildings that were not only functional but also aesthetically pleasing.

The Golden Ratio in Nature

Nature is replete with examples of the Golden Ratio, which manifests in various forms from the microscopic to the cosmic scale. The arrangement of leaves around a stem, the pattern of seeds in a sunflower, and the spiral shells of mollusks are all instances where the Golden Ratio can be observed.

One of the most famous examples is the nautilus shell, which exhibits a logarithmic spiral—a shape that grows in size but retains its form as it expands. This spiral is closely related to the Golden Ratio and the Fibonacci sequence, where each successive spiral section grows by a factor of ϕ. Similarly, the seeds of a sunflower and the scales of a pinecone are arranged in a spiral pattern that follows the Fibonacci sequence, allowing for the most efficient packing and distribution.

The human body also demonstrates the Golden Ratio in various proportions. The ratio of the forearm to the hand, the positioning of facial features, and even the structure of DNA's double helix are often cited as examples of the Golden Ratio in biological organisms. While not all claims are scientifically validated, the prevalence of this ratio in natural forms suggests an underlying order and harmony that resonates with the principles of the Golden Ratio.

Applications and Modern Usage

Beyond its historical significance, the Golden Ratio continues to be relevant in modern design, architecture, and technology. In graphic design, the Golden Ratio is used to create aesthetically pleasing layouts. Designers often use the Golden Rectangle, a rectangle whose side lengths are in the Golden Ratio, as a basis for web design, logos, and product packaging.

In photography, the Golden Ratio is employed as a compositional tool, guiding the placement of elements within the frame to achieve a balanced and visually appealing image. The rule of thirds, a common compositional technique, is a simplified version of the Golden Ratio, dividing an image into a grid that closely approximates ϕ.

Financial markets have also seen the application of the Golden Ratio, particularly in technical analysis. Traders use Fibonacci retracement levels, based on the Fibonacci sequence and Golden Ratio, to predict potential support and resistance levels in stock prices. These retracement levels are calculated as a percentage of the prior move, with key levels often corresponding to 61.8%, 38.2%, and 23.6%—all related to ϕ.

In technology, the Golden Ratio is found in the design of devices, such as the dimensions of smartphones, tablets, and televisions, where it is believed to create more appealing and ergonomic products.

The Golden Ratio's Mystique and Criticisms

Despite its widespread application and appeal, the Golden Ratio has also been subject to myth-making and

overstatement. Many supposed instances of the Golden Ratio in art and nature are based on approximations or selective interpretations. For example, while the Parthenon and the Pyramids are often cited as perfect examples of the Golden Ratio, the actual measurements do not always align precisely with ϕ.

Moreover, some critics argue that the obsession with the Golden Ratio can lead to an overemphasis on aesthetics at the expense of function and context. They caution against viewing the Golden Ratio as a universal formula for beauty, noting that different cultures and time periods have had varying ideals of proportion and harmony.

Conclusion

The Golden Ratio remains a captivating concept that bridges the worlds of mathematics, art, and nature. Its mathematical elegance, coupled with its aesthetic appeal, has made it a symbol of harmony and beauty across different fields and cultures. While it is important to approach claims about the Golden Ratio with a critical eye, its enduring presence in our world, from the spirals of galaxies to the design of everyday objects, underscores its significance as a tool for understanding and appreciating the underlying order of the universe. Whether in the structure of a nautilus shell, the design of an iconic building, or the composition of a masterpiece, the Golden Ratio continues to inspire and intrigue, representing the timeless quest for balance and beauty in the world around us.

* * *

Facinating Math Facts for Curious Minds

R. SHANMUKHA PRIYA
12th Class, Khammam

Mathematics is full of intriguing surprises, and these fascinating facts will give you a fresh perspective on the magic of numbers. They'll make the subject more relatable and might even spark your interest to discover more amazing mathematical insights.

1. Did you know that the calculator has its origins in the ancient counting tool, the abacus?
2. A neat trick with the number 9: When you multiply 9 by any other number, the sum of the digits in the result will always be 9.
3. If you add all the numbers from 1 to 100, the total is 5050.
4. Interestingly, every odd number contains the letter 'E' when written out.
5. Seven is the only number within 1 to 10 that can't be obtained by multiplying or dividing other numbers in this range.
6. The number four is the only number with the same number of letters as its value.

7. From 0 to 1000, the number 1000 is the only one that includes the letter 'A' in its written form.
8. In a group of 23 people, there's a 50% chance that two people will share the same birthday. With 75 people, this probability jumps to 99%.
9. Here's a cool cake-cutting trick: You can divide a cake into 8 equal pieces with just three cuts. Make two cuts in the shape of a cross on the top, and a third horizontal cut through the center.
10. The word 'forty' is the only number word whose letters are in alphabetical order.
11. Multiply 111,111,111 by itself, and you get 12,345,678,987,654,321. Notice how the digits form a sequence from 1 to 9 and back again?
12. Zero is unique as it is the only number that does not have a representation in Roman numerals.
13. Love baking? Then you're already using math! To bake the perfect cookie, follow the ratio 3:2:1 (three parts flour, two parts fat, and one part sugar). This is a great example of math in everyday life.
14. The plus (+) and minus (-) signs have been in use since 1489 AD.
15. A palindrome is a number that reads the same forward and backward, such as 13431.

16. Among shapes with the same area, a circle has the shortest perimeter.
17. A number is divisible by 3 if the sum of its digits is also divisible by 3.
18. Try this fun exercise: Multiply 6 by any even number. Do you notice that the product always ends with the same digit?
19. The term 'jiffy' isn't just a casual word; it actually refers to a specific amount of time—1/100th of a second.
20. Check out a dice: The opposite sides always add up to 7!

అభినందనలు

మన A.I.M.Ed కార్యవర్గ సభ్యులు D. శ్రీనివాసులు నాగార్జున విశ్వవిద్యాలయం విశ్రాంత ఆచార్యులు Prof. Dr. భవనారి సత్యనారాయణగారి పర్యవేక్షణలో "Properties of Line Graphs and Prime Graphs Based on Associative Rings" అనే విషయంలో "Degree of Doctor of Philosophy" ని 02-02-2024న పొందారు. Doctorate డిగ్రీ పొందినందుకు Dr. D. శ్రీనివాసులు గార్కి A.I.M.Ed కార్యవర్గసభ్యులు, గణితచంద్రిక సంపాదకవర్గము అభినందనలు తెలియజేస్తోంది.

ప్రస్తుతం Dr. D. శ్రీనివాసులుగారు N.R.I. Institute of Technology, ఆగిరపల్లిలో గణిత విభాగంలో అసోయేట్ ప్రొఫెసర్‌గా పనిచేస్తున్నారు.

Pioneers and Trivia in the World of Mathematics

P. JEEVAN
11th Class, Khammam

1. **Who is Known as the Father of Mathematics?** Archimedes, often regarded as the Father of Mathematics, was a brilliant Greek mathematician who lived from 287 BC to 212 BC. Born in Syracuse on the island of Sicily, he served King Hiero II of Syracuse and created innovative devices to aid the king's military efforts.
2. **Who is Recognized as the Mother of Mathematics?** Emmy Noether, a trailblazing German mathematician, has been hailed as the Mother of Mathematics. She is renowned for Noether's theorem, a cornerstone in mathematical physics, and made significant contributions to the field of abstract algebra. Albert Einstein described her as one of the most important women in the history of mathematics.
3. **Who Introduced the Concept of Zero?** The concept of Zero was formulated by the Indian mathematician and astronomer Brahmagupta in 628 AD. His work on Zero laid the foundation for its use in mathematics, and from India, the concept spread to regions such as Cambodia, China, and eventually, the Islamic world by the late 8th century.

4. **What is the Full Form of 'Maths'?** The term 'Maths' is short for Mathematics, which encompasses the study of number theory, algebra, geometry, and mathematical analysis. It is a discipline that deals with the logic of shapes, quantities, and arrangements.
5. **Who is Known as the King of Mathematics?** Leonhard Euler, born on April 15, 1707, is often celebrated as the King of Mathematics. This Swiss mathematician pioneered several fields, including graph theory, analytic number theory, infinitesimal calculus, and complex analysis. His vast contributions have profoundly influenced many areas of mathematics.
6. **Who Was the First Recipient of the Nobel Prize in Mathematics?** While there is no Nobel Prize for mathematics, the Abel Prize serves as its equivalent. This prestigious award, named after the Norwegian mathematician Niels Henrik Abel, is presented annually by the King of Norway to distinguished mathematicians. The first Abel Prize was awarded in 2003 to Jean-Pierre Serre, recognized for his substantial impact on algebraic geometry, number theory, and topology.
7. **Who is Known as the Prince of Mathematics?** Carl Friedrich Gauss, a German mathematician born on April 30, 1777, is often referred to as the Prince of Mathematics. Gauss made significant contributions to

a wide range of fields, including number theory, algebra, statistics, and analysis. His work laid the groundwork for many modern mathematical concepts, and he is regarded as one of the greatest mathematicians of all time.

8. **Who Developed Calculus Independently?** Both Sir Isaac Newton and Gottfried Wilhelm Leibniz independently developed the fundamentals of calculus in the late 17th century. Although their approaches differed, their work provided the tools for solving problems in physics and engineering, and both are credited with the invention of calculus.
9. **Who is the Father of Geometry?** Euclid, an ancient Greek mathematician, is known as the Father of Geometry. He lived around 300 BC and his work, "Elements," is one of the most influential works in the history of mathematics. It systematically compiled the knowledge of geometry of his time and laid the foundation for the subject as we know it today.
10. **Who is Known as the Father of Algebra?** Muhammad ibn Musa al-Khwarizmi, a Persian mathematician, is recognized as the Father of Algebra. He lived during the 9th century in Baghdad and his work, "Al-Kitab al-Mukhtasar fi Hisab al-Jabr wal-Muqabala," introduced the systematic solution of linear and quadratic equations, laying the foundations for modern algebra.

* * *

Mensuration questions for competitions

D. ANANYA
12th Class, Khammam

1. **A cylindrical tank has a radius of 7 meters and a height of 10 meters. Calculate the volume and the surface area of the tank.** (Volume: 1540 m^3, Surface Area: 748 m^2)
2. **A cone has a base radius of 5 cm and a height of 12 cm. Find its volume and the slant height.** (Volume: 314 cm^3, Slant Height: 13 cm)
3. **A sphere has a diameter of 14 cm. Calculate its surface area and volume.** (Surface Area: 616 cm^2, Volume: 1437.33 cm^3)
4. **A frustum of a cone has a top radius of 3 cm, a bottom radius of 6 cm, and a height of 8 cm. Find its volume.** (Volume: 452.39 cm^3)
5. **A rectangular prism has dimensions 8 cm, 6 cm, and 4 cm. Calculate its diagonal length.** (Diagonal Length: 10.77 cm)
6. **A hollow cylinder has an outer radius of 10 cm, an inner radius of 8 cm, and a height of 15 cm. Find the volume of the material used to make the cylinder.** (Volume: 1696.46 cm^3)

7. **A pyramid has a square base with a side length of 10 cm and a height of 15 cm. Calculate its volume.** (Volume: 500 cm^3)
8. **A cuboid has a length of 12 cm, a width of 8 cm, and a height of 6 cm. Find its total surface area and volume.** (Total Surface Area: 496 cm^2, Volume: 576 cm^3)
9. **A trapezoidal field has parallel sides of lengths 20 m and 30 m, and the distance between them is 15 m. Calculate its area.** (Area: 375 m^2)
10. **A sector of a circle has a radius of 14 cm and an angle of 60°. Find its area and the length of the arc.** (Area: 102.67 cm^2, Arc Length: 14.67 cm)
11. **A rectangular swimming pool is 25 m long, 10 m wide, and 2 m deep. Calculate the volume of water it can hold.** (Volume: 500 m^3)
12. **A cylindrical pipe has an inner diameter of 10 cm and a length of 2 meters. Calculate the volume of water it can hold.** (Volume: 15.71 liters)
13. **A cone has a base radius of 7 cm and a slant height of 25 cm. Find its curved surface area.** (Curved Surface Area: 550 cm^2)
14. **A sphere is inscribed in a cube with a side length of 10 cm. Calculate the volume of the sphere.** (Volume: 523.6 cm^3)

15. **A right circular cone has a height of 24 cm and a base diameter of 10 cm. Calculate its volume.** (Volume: 628.32 cm^3)

16. **A rectangular box has a length of 15 cm, a width of 10 cm, and a height of 5 cm. Find the length of the diagonal of the box.** (Diagonal Length: 18.71 cm)

17. **A cylindrical container has a radius of 5 cm and a height of 20 cm. Calculate the surface area and volume of the container.** (Surface Area: 785 cm^2, Volume: 1570 cm^3)

18. **A frustum of a cone has a top radius of 4 cm, a bottom radius of 8 cm, and a height of 12 cm. Find its surface area.** (Surface Area: 603.19 cm^2)

19. **A rectangular garden is 50 m long and 30 m wide. A path of 2 m width is constructed inside the garden along its perimeter. Calculate the area of the path.** (Area of the Path: 320 m^2)

20. **A hemispherical bowl has a radius of 7 cm. Calculate its volume and surface area.** (Volume: 718.4 cm^3, Surface Area: 462 cm^2)

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IIT Capsule

Dr. B.B. RAMASARMA

1. What is the value of $\frac{1}{2}-\frac{2}{3}+\frac{3}{4}-\frac{4}{5}+\frac{5}{6}$?

Sol. $\boxed{\frac{37}{60}}$

$$\frac{1}{2}-\frac{2}{3}+\frac{3}{4}-\frac{4}{5}+\frac{5}{6} = \frac{30-40+45-48+50}{60}=\frac{37}{60}$$

2. Seven consecutive odd numbers add up to 105. What is the largest of these numbers ?

Sol. $\boxed{21}$

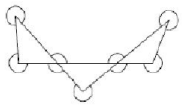
Let the fourth odd number be x. Then (x–6) + (x–4) + (x–2) + (x) + (x+2) + (x+4) + (x+6) = 105. This simplifies to 7x = 105, which gives x = 15. The largest of the seven consecutive odd numbers is 15 + 6 = 21.

3. In a class, 55% of student scored at least 55% on a test. 65% of students scored at most 65% on the same test. What percentage of students scored between 55% and 65% (inclusive) on the test ?

Sol. $\boxed{20\%}$

As 55% of students scored at least 55% on the test, 45% of the students scored less than 55%. Also 65% of students scored 65% or less on the test, so the percentage of students who scored between 55% and 65% (inclusive) is 65%–45% = 20%.

4. What is the sum of the marked angles in this diagram?



Sol. 1980°

First we consider the sum of the angles around each of the seven vertices of the three triangles, which is $7 \times 360° = 2520°$. The sum of the marked angles is the previous sum minus the sum of the interior angles of the three triangles, which is $2520° - 3 \times 180° = 25020° - 540° = 1980°$.

5. Consider the six-digit multiples of three with at least one of each of the digits 0,1 and 2 and no other digits. What is the difference between the largest and the smallest of these numbers ?

Sol. 122 208

Multiples of three have a digit sum which is divisible by three. The six-digit numbers we are considering must have the digits 0,1 and 2 occurring at least once. These

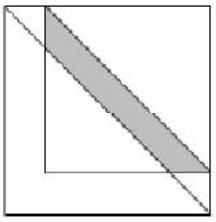
three digits sum to 3, which means the three remaining digits must also sum to a multiple of three. To create the largest possible number, we want to maximise the digits used from left to right. To create the smallest possible number, we want to minimise the digits used from left to right but the first digit must not be 0 or else the number does not have six digits. For the largest such six-digit number we can use another three digit 2s and for the smalest we can use another three digits 0s. The largest possible number formed of the relevant digits is 222 210 and the smallest possible number formed of the relevant digits is 100 002. The difference we want is 222 210 – 100 002 = 122 208.

6. Two positive numbers a and b, with a>b, are such that twice their sum is equal to three times their difference. What is the ratio a : b ?

Sol. $\boxed{5:1}$

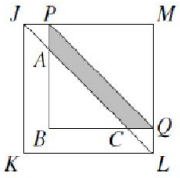
The information given can be written as 2(a+b) = 3 (a–b), which upon expansion of the brackets gives 2a + 2b = 3a – 3b. After rearrangement we have that 5b = a and so the ratio a:b is 5 : 1.

7. The diagram on the right shows a 4 by 4 square placed on top of a t by 5 square, so that they have one vertex in common as shown. One diagonal of each square is also drawn. What is the area of the shaded region that is inside the 4 by 4 square and between the two diagonals ?



Sol. $\boxed{3.5}$

Referring to the diagram on the right, JL is a diagonal of the square JKLM therefore $\angle PJA = 45^\circ$. The given configuration of the two squares means that $\angle APJ = 90^\circ$



therefore $\angle JAP = 180^\circ - 45^\circ - 90^\circ = 45^\circ$. Hence triangle APJ is isosceles and AP = JP. As JP is the difference between the side lengths of the two squares, then AP = JP = 5 – 4 = 1. Similarly, we can deduce that CQ = 1. The shaded area is equal to the area of triangle PBQ minus the area of triangle ABC. As AB = BC = 4–1, this is $\frac{1}{2}\times 4\times 4 - \frac{1}{2}\times 3\times 3 = 3.5$ square units.

8. The sum of the numbers 1 to 123 is 7626. One number is omitted so that the sum is now a multiple of 4. How many different numbers could be omitted?

Sol. 31

7626 is two more than a multiple of four, which means for the reduced sum to be a multiple of four then the number omitted must also be two more than a multiple of four. The sequence of relevant numbers that could be removed is 2, 6, 10, ..., 122. If we add two to each of these and then divide by four we get the sequence 1, 2, 3, ... 31. This shows that we could omit 31 different numbers.

9. Dividing 52 by 12 gives 4 remainder 4. What is the sum of all the numbers for which dividing by 12 gives a whole number answer which is the same as the remainder?

Sol. 858

Using the example given we can write $52 = 12 \times 4+4 = 13\times4$, and so in general we are looking for numbers of the form $12m + m = 13m$ where m is any possible remainder when dividing by tweleve. When dividing

by twelve the possible remainders are 0, 1, 2, ..., 11. The sum we want is $13 \times 0 + 13 \times 1 + 13 \times 2 + ... + 13 \times 11$. This can be rewritten as $13(0 + 1 + 2 + ...11) = 13 \times 66$ and so desired sum is 858.

10. Farmer A lice has an alpaca, a cat, a dog, a gnu and a pig. She also has give fields in a row. She wants to put one animal in each field, but doesn't want to put two animals in adjacent fields if their names contain the same letter. In how many different ways can she place her animals ?

Sol. $\boxed{4}$

The pig shares a letter with three other animals (alpaca, dog and gnu) and so it must have only one neighbout. This means that the pig must go at either end of the row and must be adjacent to the cat. The dog and gnu cannot be neighbours as they share the letter g, which means that the alpaca must be placed between them. The dog or the gnu can be placed next to the cat. This means that there are two choices for where the pig is placed, and for each of these choices there are two choices for which animal is placed next to the cat, and so in total there are $2 \times 2 = 4$ different arrangements.

* * *

A.I.M.Ed చే నిర్వహించబడిన MSET - 2023 పరీక్ష బహుమతి ప్రదానోత్సవ సభ- నివేదిక

Association For Improvement of Maths Education, విజయవాడవారి ఆధ్వర్యంలో నిర్వహింపబడిన 22వ రాష్ట్రస్థాయి MSET-2023 బహుమతి ప్రదానోత్సవ సభను ది.11-02-2024న M.S.R.Eng. Med. హైస్కూల్, విజయవాడ-1లో ఉదయం 9గం. నుంచి మధ్నాహ్నం 2గం.ల వరకు నిర్వహించారు. మొదటగా శ్రీ M.B.V. లోకేశ్వరరావు అతిథులను క్లుప్తమైన పరిచయ వాక్యాలతో స్టేజ్‌పైకి ఆహ్వానించారు.

ఈ సభకు Prof. భవనారి సత్యనారాయణగారు అధ్యక్షత వహించగా, ముఖ్య అథిధులుగా Lion శ్రీ Ch.V. నరసింహారావు, Director, A.I.M.Ed; శ్రీ కొల్లూరి, President, Xray; Dr. అయోధ్య, ప్రముఖ మానసిక వైద్యులు శ్రీ A. రామకృష్ణ, Director, Vivekananda High School, Piduguralla, శ్రీ అమర్‌సుధీర్, Secretary, M.S.R. Eng. Med. High School, శ్రీ K. ప్రభాకర్, Ex. President, A.I.M.Ed, శ్రీకాశీవిశ్వనాధం, విశ్రాంత ఉపాధ్యాయులు పాల్గొన్నారు.

శ్రీ అమర్ సుధీర్ గారు ఇతర అతిథులతో కలసి జ్యోతి ప్రజ్వలన చేయగా స్థానిక విజ్ఞానవిహార్ విద్యార్థులు ప్రార్థనాగీతాన్ని ఆలపించారు. వందేమాతరం పూర్తి గీతాన్ని వివేకానంద పాఠశాల పిడుగురాళ్ళ విద్యార్థులు ఆలపించారు.

అనంతరం సభ ప్రారంభమయింది. కొల్లూరిగారు తమ ప్రసంగంలో దేశభక్తిని ప్రభోదించే అనేక విషయాలు వివరించారు. గాంధి, ఐన్‌స్టీన్‌లాంటివారి అడుగుజాడలలో నడవాలన్నారు. మోక్షగుండం విశ్వేశ్వరయ్య, K.L. రావు వంటి

ఇంజనీర్లను ఆదర్శంగా తీసుకోవాలన్నారు. Ch.V. నరసింహారావుగారు A.I.M.Ed స్థాపన, దాని ధ్యేయాలు, గణితనమూనాల పరిచయం, గణితచంద్రిక గూర్చి వివరించారు. Dr. అయోధ్యగారు తమ ప్రసంగంలో విద్యార్థులు సత్‌ప్రవర్తనతో కష్టపడి, ఇష్టపడి చదివితే ఏదైనా సాధించవచ్చని అన్నారు. పిల్లల చదువుల వెనుక తల్లిదండ్రుల బాధ్యత ఎంతో ఉందన్నారు. ఇటీవలి కాలంలో విద్యార్థులపై Cell Phone ప్రభావం చాలా ఉంటోందన్నారు. A. రామకృష్ణగారు తమ ప్రసంగంలో వేదకాలం నుంచి ఇప్పటివరకు జీవనశైలిలో గణితం పాత్ర వివరించారు. K. ప్రభాకర్‌గారు తను అధ్యక్షునిగా ఉన్నప్పటి అనుభవాలు వివరించారు. బహుమతులు అందుకోబోతున్న విద్యార్థులను అభినందించారు.

శ్రీ R. శ్రీధర్, Co-convenor కన్వీనర్ రిపోర్టు చదివి పరీక్షల నిర్వహణ గూర్చి పలు వివరాలు సమర్పించారు.

అధ్యక్షులు Prof. భవనారి సత్యనారాయణగారు అందరి ప్రసంగాలను సమీక్షిస్తూ, A.I.M.Ed పని విధానాలను, దాని ధ్యేయాన్ని వివరించారు. Talent Test నిర్వహణలో లక్ష్యం, పరీక్షల నిర్వహణలో గల సమస్యలను తెలియజేశారు. బహుమతి గ్రహీతలను అభినందించారు.

ప్రతి సంవత్సరం నిర్వహించే "Presentation of Best Mathematics Teacher award" పురస్కారానికి ఈ సంవత్సరానికి ఇటీవలె Doctrate తీసుకున్న మన సభ్యులు Dr. D. శ్రీనివాసులుని ఎంపిక చేసి వారిని ఘనంగా సన్మానించి బహుమతి అందచేశారు.

అనంతరం అతిథులచే విద్యార్థులకు బహుమతులు అందజేయబడ్డాయి. అతిథులకు సన్మాన కార్యక్రమం జరిగింది. పరీక్ష నిర్వహణలో పాల్గొన్న సభ్యులకు కూడా బహుమతులు అందజేశారు. శ్రీ M.B.V. లోకేశ్వరరావు వందనసమర్పణతో సభముగిసింది.

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CONVENOR'S REPORT

Associate For Improvement of Maths Education నిర్వహించిన M.SET - 2023 విజేతలకు బహుమతి ప్రదానోత్సవానికి విచ్చేసిన అతిథులకు స్వాగతం, సుస్వాగతం.

ఈ కార్యక్రమానికి తమ చిన్నారులను వెంట తీసుకువచ్చిన తల్లిదండ్రులకు, ఉపాధ్యాయులకు, పెద్దలకు నమస్కారములు. ఈ వేదిక నుంచి బహుమతులు అందుకోబోతున్న చిన్నారులకు శుభాకాంక్షలు.

మా సంస్థ 2000 సంవత్సరం నుంచి టాలెంట్ టెస్ట్‌ని ప్రతి సంవత్సరం నిర్వహిస్తోంది. కాని 20-21, 21-22 సంవత్సరాలలో కరోనా కారణంగా పరీక్ష నిర్వహించలేదు. 22-23లో పరీక్ష నిర్వహించినప్పటికీ కరోనా కారణంగా బహుమతి ప్రదానోత్సవం నిర్వహించలేకపోయాము. బహుమతులను, సర్టిఫికెట్లను వారివారి పాఠశాలలకు అందజేశాము. ఆ సంవత్సరం కరోనా ఎఫెక్ట్ ఉన్నా పరీక్ష నిర్వహణకు సహకరించిన పాఠశాల యాజమాన్యాలకు మా ధన్యవాదాలు.

గత సంవత్సరం నవంబర్ 25న పరీక్ష నిర్వహించడం జరిగింది. పరీక్షకు 14 జిల్లాల నుండి 39 కేంద్రాల ద్వారా సుమారు 8000 మంది హాజరైనారు. పరీక్షలో 5వ తరగతి నుండి 10వ తరగతివరకు చదివే విద్యార్థులు పాల్గొన్నారు. 21 డిసెంబర్ రాష్ట్రస్థాయి మరియు జిల్లా స్థాయి విజేతల వివరాలు, తరువాత వారంలో మిగిలిన అందరు విజేతల వివరాలను website ద్వారా విడుదల చేయటం జరిగింది.

ఈ సంవత్సరం రాష్ట్రస్థాయిలో అన్ని తరగతులలోను 10మంది ప్రథమ స్థానాన్ని, 14 మంది ద్వితీయ స్థానాన్ని, 25 మంది తృతీయ స్థానాన్ని పొందారు.

ప్రథమ స్థానం పొందినవారికి రూ.1200/–, ద్వితీయ స్థానానికి రూ.1100/–, తృతీయస్థానానికి రూ. 1000/– చొప్పున మొత్తం 52,400లు పారితోషికంగా ఇవ్వబడుతోంది. నగదుతోపాటు memento, ప్రశంసా పత్రం వీరికి ఇవ్వబడతాయి.

రాష్ట్రస్థాయి, జిల్లా స్థాయి ప్రథమ, ద్వితీయ, తృతీయ స్థానాలు సాధించిన విద్యార్థులందరికీ మా శుభాకాంక్షలు. బహుమతి గ్రహీతలు ముందు ముందు మరింత ఉన్నత శిఖరాలు అధిరోహించాలని ఆకాంక్షిస్తున్నాము.

ఈ పరీక్షకు తమ విద్యార్థులను ప్రోత్సహించిన తల్లిదండ్రులకు, విద్యాసంస్థల ప్రధానోపాధ్యాయులు, యాజమాన్యాలకు మా ధన్యవాదాలు. ఇక ముందు కూడా ఇదే రకమైన సహకారాన్ని అందిస్తారని ఆశిస్తున్నాం.

పరీక్షల నిర్వహణ గూర్చి ఏమైనా సలహాలు, సూచనలను లిఖితపూర్వకంగా అందిస్తే మరింత మెరుగ్గా నిర్వహిస్తాము.

సకాలంలో పరీక్ష నిర్వహణ, ప్రశ్నాపత్రాల తయారి, ముద్రణ, పంపిణీ, ఫలితాల ప్రకటనకి సహకరించిన మిత్రులందరికి ధన్యవాదాలు. స్టాఫ్‌కు మార్గదర్శిగా నిలిచిన శ్రీ M.B.V. లోకేశ్వరరావుకి, Office Staff M. Pardhu, శ్రీమతి లక్ష్మిలకి ధన్యవాదములు. ఈ నాటి బహుమతి ప్రదానోత్సవ కార్యక్రమానికి Conference Hall ఇచ్చిన M.S.R. Eng. Medium High School Management వారికి ధన్యవాదాలు. 85 సంవత్సరాల వయస్సులో పరీక్ష నిర్వహణకు, ఈనాటి కార్యక్రమా నిర్వహణకు తగిన సలహాలు, సూచనలు అందించిన మా Director Ch. V. నరసింహారావుగారికి మా కృతజ్ఞతలు.

విజయవాడ — R. Sridhar

Dt. 11-02-2024 — Co-Convenor

Some Problems from MSET- 2023

CLASS - V

1. Number of hundreds in ten lakhs:

1) Thousand 2) Ten Thousand
3) Hundred 4) One Lakh

2. Number of four digit numbers that can be formed by using the digits 3, 0, 8,4

1) 18 2) 16 3) 4 4) 8

3. [(1+2010) + (2+2009 + (3+2008) +.....+ (10+ 2001)] ÷ 2011 =

1) 2011 2)200 3) 100 4) 10

4. The digit which is neither prime nor composit is

1) 0 2) 1 3) 10 4) 5

5. A businessman had 75 litters of groudnut oil and 45 litters of sunflower oil. He wanted to pack them in tin of equal maximum capicity. The capacity of the tin ..... lts.

1) 15 2) 25 3) 5 4) 3

6. The signs that should be kept in the boxes given below (in the same order) (46×5–1) □ (37×4 + 11) □ (72×3–5)

1) >, > 2) >, < 3) <, < 4) <, >

7. Ten crores, two lakhs, five thousand, one hundred and two in standard number form:

1) 10,02,50,102 2) 10,20,05,102
3) 10,02,05,120 4) 10,02,05,102

8. **A pair of shoes cost Rs.250/-. A donar want to take ten pairs. The shopkeeper gave concession Rs25/- on each pair. The amount donar has to pay Rs.....**

1) 2750 2) 2250 3) 2500 4) 2000

9. **A to Z alphabets are number as 1 to 26. In a particular fassion *CAR* $\rightarrow$ *XZI*; *BUS* $\rightarrow$*YFH then VAN* $\rightarrow$**

1) EZM 2) EYN 3) DZN 4) FZM

10. **Teacher gave a problem 385 x 25 in the class**
A) Rakesh did it as (300+ 80 + 5) x 25
B) Roja did it as (400 -15) $\times$ 25 who is correct

1) A 2) B 3) Both A and B 4) Neither A nor B

11. **(Six digit gratest number)$\div$(Two digit gratest number) =**

1) 111111 2) 10010 3) 10001 4) 10101

12. **Which of the following is not zero**

1) 25×0 2) $\frac{0}{5}$ 3) $15 \div 0$ 4) $\frac{5-5}{8}$

13. **Digital root of 2548 is .....**

1) 4 2) 19 3) 1 4) 10

14. **Teacher asked the student to multiply a number with 11, but the student divided the number with 11 and got answer 45. If he had actually multiplied, the correct answer is .....**

1) 495 2) 5454 3) 4959 4) 5445

15. **A can run round a stadium in 6 minutes and B in 8 minutes. Both started at a time at a point. Number of times they meet at the same point in 2 hours.....**

1) 10 2) 5 3) 8 4) 4

CLASS - VI

1. **The product of two numbers is 48. Their sum is 19. What are the numbers .....**

   1) 24,2 2) 16,3 3) 8,6 4) 12,4

2. **The numbers between 1 and 100 having exactly 3 factors.....**

   1) 6,9,25,49 2) 6,25,49,64
   3) 4,9,25,49 4) 6,10,12,15

3. **Which of the following number is prime.**

   1) 179 2) 117 3) 121 4) 153

4. **The H.C.F of 144, 180 and 192 is....**

   1) 12 2) 24 3) 36 4) 48

5. **The largest number which divides 245 and 1029 having remainder 5 in each case.**

   1) 16 2) 8 3) 22 4) 4

6. **What is the smallest number that when divided by 35, 56 and 91 leaves remainder of 7 in each case.**

   1) 3674 2) 3764 3) 3647 4) 3746

7. **If x and y are two co - primes , then their L.C.M is.....**

   1) xy 2) x + y 3) x/y 4) 1

8. **Three numbers are in the ratio 1 : 2 : 3 and their H C F is 6. The numbers are.....**

   1) 4,8,12 2) 5,10,15
   3) 6,12,18 4) 10,20,30

9. **How many whole numbers are there between 32 and 53.**

   1) 21 2) 20 3) 19 4) None

10. **The product of the successer and predecesser of 99 is .....**

    1) 9900 2) 9800 3) 1099 4) 9700

11. **If two numbers are equal, then their LCM ____their HCF**

    1) = 2) < 3) > 4) 2 times

12. **What should be added to 18 to get -34**

    1) 52 2) -52 3) -16 4) 16

13. **Simplify : 9 x (-16) + (-17) x (-16)**

    1) 126 2) 127 3) 128 4) 129

14. **If x = -23 + 22 -23 + 22.....(40 terms)**
    y = 11 + (-10) + 11 + (-10) .....(20 terms) then find y - x .

    1) 41 2) 40 3) 42 4) 39

15. **If Δ is an operation on integers such that a Δb = a - b - (-5) for all integers a , b . find the value of 2 Δ5.**

    1) -2 2) 2 3) 0 4) 5

CLASS - VII

1. **If $4^{2x} = 16$ then x = _____**

1) 1 2) 2 3) 3 4) 0

2. **The Simplest form of $\frac{1}{4^2} : \frac{1}{6^2}$ =_____**

1) $3^2 : 2^2$ 2) 4:9 3) 4:6 4) $6^2 : 4^2$

3. **If the median of the observations of 10, 12, 14, x-3, x, x+2, 25 is 15. Then the value of x is**

1) 08 2) 15 3) 18 4) 12

4. **The product of three _____ does not depend upon the grouping of integers.**

1) Integers 2) Whole numbers

3) Square numbers 4) None

5. **Formula for Total Loss:**

1) Loss incurred - profit earned

2) Profit earned - Loss

3) Profit earned + Loss incurred

4) None

6. **Can you tell what is $\frac{2}{5}$ of $\frac{3}{5}$ is_____**

1) $\frac{3}{25}$ 2) $\frac{6}{25}$ 3) $\frac{2}{25}$ 4) $\frac{7}{12}$

7. **$2.5 \times 3\frac{1}{3} \times 4.5$ = _____**

1) 35.5 2) 31.5 3) 37.5 4)32.5

8. **Write two numbers between $\frac{1}{4}$ and $\frac{1}{5}$**

1) $\frac{21}{100}, \frac{2}{100}$ 2) $\frac{21}{100}, \frac{11}{50}$ 3) $\frac{22}{100}, \frac{21}{50}$ 4) None

9. **Another name of simple mean is**

1) A.M 2) Geometric Maen 3) Range 4) None

10. **Reciprocal of $\frac{3}{5}$ of $\frac{1}{5}$ of $\frac{5}{2}$ is**

1) $\frac{5}{6}$ 2) $\frac{2}{5}$ 3) $\frac{3}{5}$ 4) $\frac{2}{3}$

11. **25.025÷0.025=_____**

1) 1001 2) 10.1 3) 1.01 4) 101

12. **Zero of the polynomial of 54-18x is_____**

1) 54 2) 18 3) 3 4) 2

13. **$\frac{1}{37}$ is in decimal form _____**

1) 0.027 2) $0.\overline{027}$ 3) 0.277 4) 0.077

14. $\left(\frac{54}{3}+\frac{72}{6}\right)^2$ **=_____**

1) 300 2) 900 3) 324 4) 400

15. **The number of nine's in 1 to 100 is_____**

1) 20 2) 21 3) 22 4) 23

CLASS - VIII

1. **Between any two given rational numbers there are countless rational numbers the idea of _____ helps us to find rational numbers between 2 rationals**

1) Graph 2) Mean 3) Addition 4) Subtraction

2. **Which of the following is the multiplicative inverse of $-1\frac{1}{8}$**

1) $1\frac{1}{8}$ 2) $\frac{9}{8}$ 3) $-\frac{9}{8}$ 4) $-\frac{8}{9}$

3. $2\frac{1.5}{5}+2\frac{1}{6}-1\frac{3.5}{15}=\frac{x^{\frac{1}{3}}}{4}+1\frac{7}{30}$ **then** $x =$ _____

1) 2 2) 8 3) 324 4) 512

4. **The value of $3.8 - (4.2 \div 0.7 \times 3) + 5 \times 2 \div 0.5$ is_____**

1) 18.4 2) 5.8 3) 21.8 4) 15.6

5. **If x = 10 and y = 0.1, which of the following is the greatest ?**

1) $x^2 + y^2$ 2) $x^2 - y^2$ 3) x^2y^2 4) $\frac{x^2}{y^2}$

6. **If $1^3 + 2^3 + ... + 9^3 = 2025$ then the value of $(0.11)^3 + (0.22)^3 + ... + (0.99)^3$ is close to :**

1) 0.2695 2) 0.3695 3) 2.695 4) 3.695

7. **The perimeter of a rectangle is 13cm and its width is $2\frac{3}{4}$ cm. Find its length.**

1) $4\frac{3}{4}$ 2) $\frac{15}{4}$ 3) $2\frac{3}{4}$ 4) $4\frac{2}{3}$

8. **Present ages of Anu and Raj are in the ratio 4:5. Eight years from now the ratio of their ages will be 5:6. Their present ages are_____**

1) 40, 32 2) 32, 40 3) 28, 35 4) 35, 28

9. **The cost of 4 rings and 2 bangles is 57,200 rupees. Then the cost of 6 rings and 3 bangles is _____**

1) 85,800 2) 95,800 3) 75,800 4) 65,800

10. **A pineapple costs 7 eupees each, A water melon costs 5 rupees each. X spends 38 rupees on these fruits. The No.of pine apples purchased is _____**

1) 2 2) 3 3) 4 4) Data Inadequate

11. **Ram has 6 rupees more than Mohan and 9 rupess more than Sohan. All the three persons have 33 rupees in all. Ram has a Share of**

1) 7 2) 10 3) 13 4) 16

12. **If 74 is divided in to two parts so that 5 times one part and 11 times the other part are together equal to 454. the parts are**

1) 14, 60 2) 60, 14 3) 30, 44 4) 44, 30

13. **A kite is a quadrilateral with exactly two pairs of _____ consecutive sides**

1) equal 2) Perpendicular
3) Similar 4) None

14. **How many sides does a regular polygon have if each of its interior angles is 165 ?**

1) 12 2) 24 3) 36 4) 18

15. **Sum of the angles of convex polygon with 10 sides is _____**

1) 360 2) 720 3) 1080 4) 1440

CLASS - IX

1. **1 - 2 + 3 -4 +.....+ 2023 - 2024 + 2025 = ...**

   1) 1013 2) 2025 3) 1014 4) 2026

2. **Triangle formed by vertices (3,3), (0,3), (3,0) is _____ triangle.**

   1) Isosceles Right angled 2) Scalene
   3) Equilateral 4) None of these

3. **Number of prime numbers between 2 and 99 is .....**

   1) 20 2) 24 3) 18 4) 17

4. **S = 111.....11 (100 digits) - 2222.....22 (50 digits) , then the sum of digits of S = ...**

   1) 400 2) 848 3) 629 4) 450

5. **Number of positive integral divisors of 5×10^2 will be**

   1) 12 2) 16 3) 8 4) 49

6. **The remainder when $x^3 - 6x^2 + 11x - 6$ is divided by $x - 4$ is .....**

   1) 6 2) 0 3) 1 4) -2

7. **On dividing a number by 56, we get 29 as reminder. On dividing the same number by 8, what will be the reminder ?**

   1) 4 2) 6 3) 5 4) 2

8. **The German Mathematician who first proved that any polygon can be transformed into any other polygon of equal area by cutting it into finite number of pieces.**

   1) Henry Emest Dudency 2) David Hilbert
   3) Descartes 4) Euclid

9. **The ratio of the angles in a golden triangle.**

1) 1:1:1 2) 1:1:4 3) 1:2:3 4) 1:2:2

10. $\left(x^2+y^2-z^2\right)^2-\left(x^2-y^2+z^2\right)^2$ = _____

1) $4x^2y^2-4x^2z^2$ 2) $4x^2y^2z^2$ 3) $x^4+y^4+z^4$ 4) 0

11. **If $a = 3 + 2\sqrt{2}$,Then what is the value of**

$$\frac{\left(a^6-a^4-a^2+1\right)}{a^3}$$

1) 198 2) 204 3) 192 4) 210

12. **The three sides of a right angled triangle are x, x+1 and 5. Find x and the area if the longest side is 5.**

1) 3,6 2) 4,5 3) 3,5 4) 5,6

13. **Number of factors with rational coefficients for $x^4 + x^2 + 1$ is .....**

1) 3 2) 4 3) 2 4) 0

14. **Number of terms in the final product of $1 + a$, $1 + a^2$, $1 + a^4$, $1 + a^8$, $1 - a$**

1) 12 2) 4 3) 2 4) 24

15. **$10a^2 + 11b^2 = 22$ and $11a^2 = 78 - 10b^2$, then $a^2 + b^2$ = ...Number**

1) Natural 2) Irrational 3) Rational 4) Negative

CLASS - X

1. Degree of $(x-1)(x^2-2)(x^3-3).....(x^{10}-10)$ is ___

1) 10 2) 55 3)60 4) 200

2. $2x^2+3y^2 = 70$, $3x^2+2y^2 = 30$ then $x^4+(2x^2 + y^2)y^2$ = ___

1) 270 2) 800 3) 400 4) 100

3. Two numbers have LCM =50 and GCD = 5. Square of the product of numbers is

1) $5^6 \times 4$ 2) $5^6 \times 10^2$ 3) $2^3 \times 5^8$ 4) $2^6 \times 5^6$

4. $x=\sqrt{2\sqrt{2\sqrt{2\sqrt{2.....\infty}}}}$, $y=\sqrt{6\sqrt{6\sqrt{6\sqrt{6.....\infty}}}}$ then

$\frac{x}{2}+\frac{y}{3}$ = ____

1) 1 2) 12 3) 3 4) 6

5. If a = –2023, b = 1998, c = 25 then $\frac{a^2}{bc}+\frac{b^2}{ca}+\frac{c^2}{ab}$ =___

1) 4 2) 2023 3) 3 4) - 4046

6. Difference of mean and median for first 200 natural numbers is

1) 0 2) 100 3) 100.5 4) 50.5

7. If $\frac{a^n+b^n}{a^{n-1}+b^{n-1}}=\sqrt{ab}$ then $4n^2 - 4n + 3$ =

1) 2 2) 0 3) 3 4) –7

8. **If (1,3), (2,5), (4,9), (17,x) are collinear then $\frac{x-30}{2x-69}$ = _____**

1) 5 2) 6 3) 0 4) 12

9. **A right triangle has legs 6 and 8. The length of altitude from vertex to hypotenuse is __**

1) 4 2) 4.8 3) 6.2 4) 6.6

10. **$|x|+|y|=|x+y| \Rightarrow$ _____**

1) $xy = -8$ 2) $xy = -1$ 3) $xy < -8$ 4) $xy \geq 0$

11. **$x = 7 + 4\sqrt{3}$ then $x^2 + \frac{1}{x^2}$ = _____**

1) 243 2) 194 3) 270 4) 189

12. **$(x + a)(x + 2) + 1 = 0$ has $x,a \in Z$ then sum of possible values of a= .....**

1) 0 2) 2 3) 4 4) 8

13. **From first 100 natural numbers one is selected at random. The chance that it is a prime number.**

1) 1/2 2) 1/4 3) 2/3 4) 3/4

14. **ABCD is any quadrilateral in the co-ordinate plane. Then the quadrilateral formed by its mid points of sides is always.**

1) Trapezium 2) Square
3) Parallelogram 4) Scalene quadrilateral

15. **Number of solution pairs (x,y) satisfying the equation $x^2 + y^2 + 6x + 4y + 13 = 0$ is ____**

1) 1 2) 2 3) 0 4) Infinite

* * *


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